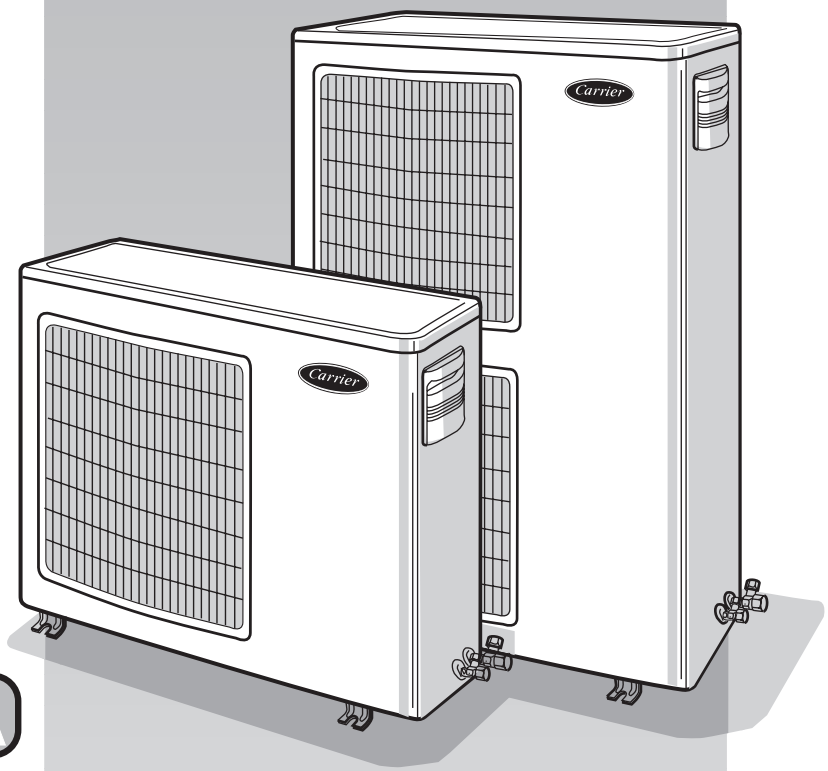
Carrier

38YY...G9 / 38YYS...G9



R-410A

INSTALLATION MANUAL

38YY...G9 / 38YYS...G9 R-410A
Heat pump split system outdoor units

For operation and maintenance instructions of this unit as well as installation instructions of the indoor unit, refer to the relevant manuals.

ENGLISH

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ATTENTION INSTALLERS AND SERVICE TECHNICIANS!
AIR CONDITIONER WITH R-410A–QUICK REFERENCE GUIDE

- R-410A refrigerant operates at 50%-70% higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A refrigerant cylinders are rose colored.
- R-410A refrigerant cylinders have a dip tube which allows liquid to flow out of cylinder in upright position.
- R-410A systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose in order to vaporize the liquid refrigerant before the entrance in the unit.
- R-410A, as with other HFCs, is only compatible with oils selected by compressor manufacturer following.
- Vacuum pump is not enough to remove moisture from oil.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, break vacuum with dry nitrogen and replace filter driers.
- Do not vent R-410A into the atmosphere.
- Use only Carrier indoor units according to qualified matching (Table I).

Unit size	Oil type	Quantity cc	Drier already installed on liquid line of the unit
28 - 36 - 48	POE	1250	YES
60	POE	1950	YES

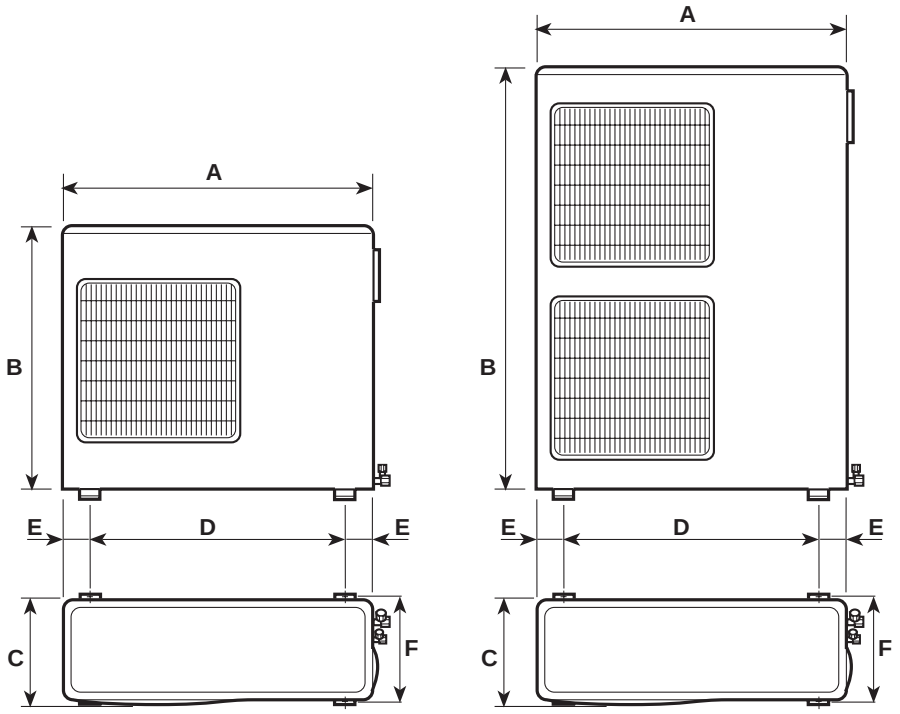
Table I

Heat pump models 38YY... / 38YYS...	Cassette 40KMC---7N	Console 42VMC---N	Satellite 40SMC---N
38YY-028G9	028	028	028
38YY-036G9	036	036	036
38YY-048G9	048	048	048
38YY-060G9	060	—	060

Power supply: 400V 3N~ 50Hz

38YY...G9 / 38YYS...G9 R-410A

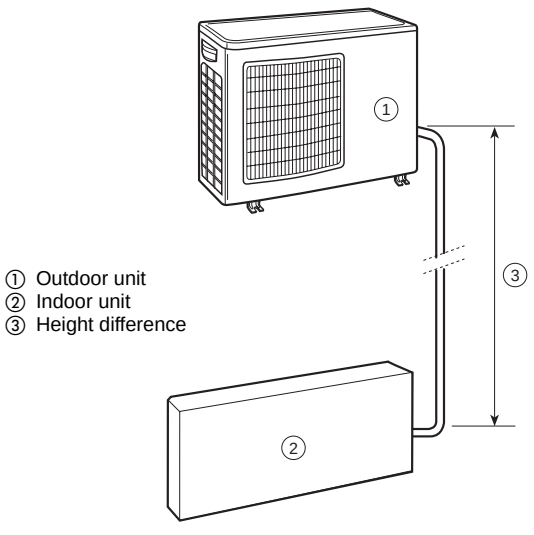
Dimensions and weight



Mod. 38YY 28 - 36 Mod. 38YY 48 - 60

Mod.		38 YY---G9 / 38 YYS---G9			
		28	**36**	**48**	**60**
A	mm	800	800	800	800
B	mm	803	803	1264	1264
C	mm	300	300	300	300
D	mm	508	508	508	508
E	mm	146	146	146	146
F	mm	330	330	330	330
kg	kg	67	68	94	96

Connections



① Outdoor unit
② Indoor unit
③ Height difference

Table II: Connections

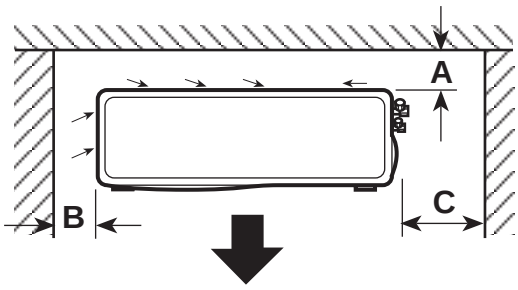
	Model			
	28	**36**	**48**	**60**
Max. pipe length	40 m	50 m	50 m	50 m
Max. height difference	25 m	30 m	30 m	30 m

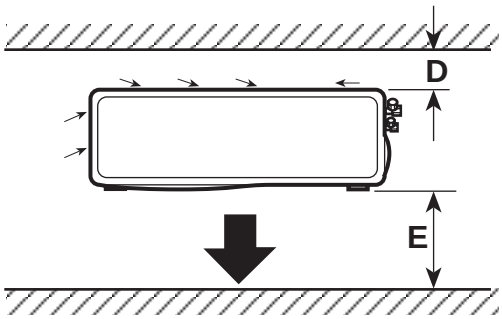
All fittings are flare type.

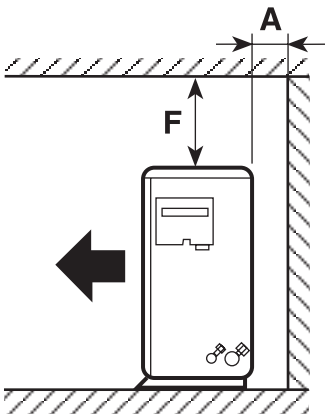
Use only refrigeration grade pipes, (Cu DHP type according to ISO 1337), seamless, degreased, deoxidized and suitable for operating pressures of at least 4200 kPa and with a burst pressure of 20700 kPa.
Under no circumstances must sanitary type copper pipe be used.

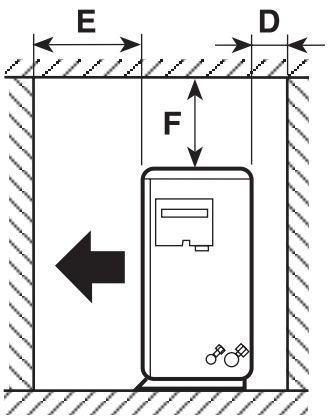
Model	Pipe diameter mm		Pipe diameter inches	
	Gas (Suction)	Liquid (Liquid)	Gas (Suction)	Liquid (Liquid)
28	15.87	6.35	5/8"	1/4"
36 48 60	19.05	9.52	3/4"	3/8"

Minimum clearances









Mod.		28	36	48	60
A	mm	100	100	100	100
B	mm	250	250	250	250
C	mm	500	500	500	500
D	mm	100	100	100	100
E	mm	670	670	670	670
F	mm	400	400	400	400

System charge

	Size	Nameplate	Suitable up to m	Extra charge g/m	Extra charge (g) with indoor unit	
					42VMC---(A)*N	40SMC---N
Heat pump	28	2175	8	30	—	100
Heat pump	36	2750	8	70	—	450
Heat pump	48	3650	8	70	—	—
Heat pump	60	4660	8	70	—	450

*(A)= Aluminium version

General information

Unit installation

R-410A systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.
Read this instruction manual thoroughly before starting the installation.

- **This unit complies with low-voltage (EEC/73/23) and electro magnetic compatibility (EEC/89/336) directives.**
- The installation must be carried out by a qualified installer.
- Follow all current national safety code requirements. In particular ensure that a properly sized and connected ground wire is in place.
- Check that voltage and frequency of the main power supply are those required; the available power must be adequate to operate any other possible appliances connected to the same line. Also ensure that national safety code requirements have been followed for the main supply circuit.
- The main supply must be connected to the outdoor unit.
- Connect indoor and outdoor units with field-supplied copper pipes by means of flare connections. Use insulated seamless refrigeration grade pipe only, (Cu DHP type according to ISO1337), degreased and deoxidized, suitable for operating pressures of at least 4200 kPa and for burst pressure of at least 20700 kPa. Under no circumstances must sanitary type copper pipe be used.
- After installation thoroughly test the system operation and explain all system functions to the owner.
- Leave this manual with the owner for consultation during future periodic maintenance.
- Use this unit only for factory approved applications.
- The outdoor unit and its components must be periodically inspected to check for loose, damaged or broken parts. If these faults are found and not eliminated, the unit could cause physical injury to persons and damage to goods and property.
- This installation manual describes the installation procedures of the outdoor unit of a residential split system consisting of two units manufactured by Carrier. Consult factory or a qualified system engineer prior to connecting this unit to any other manufacturer's indoor unit. Coupling units which have different control systems, may cause irreversible damage and void the warranty protection. The manufacturer declines any liability for system malfunction resulting from unapproved coupling.

IMPORTANT:
During the unit installation make first refrigerant connections and then electrical connections. If unit is uninstalled first disconnect electrical cables, then refrigerant connections.
WARNING:
Disconnect the main power supply switch before servicing the system or handling any internal parts of the unit.

- The manufacturer declines any liability for damage resulting from modifications or errors in the electrical or refrigerant connections.
- Failure to observe the installation instructions or use of the unit under conditions other than those indicated in Table III “Operating limits”, will immediately void the unit warranty.
- Failure to observe electric safety codes may cause a fire hazard in case of short circuits.
- Inspect equipment for damage due to improper transportation or handling: file an immediate claim with the shipping company. Do not install or use damaged units.
- In case of any malfunctioning turn the unit off, disconnect the mains power supply and contact a qualified service engineer.
- This equipment contains R-410A refrigerant, a substance that is not depleting ozone gas layer.
- **All of the manufacturing and packaging materials used for your new appliance are compatible with the environment and can be recycled.**
- Dispose of the packaging material in accordance with local requirements.
- This equipment contains coolant that must be disposed of in a proper manner. When disposing of the unit after its operational life, remove it carefully. The unit must then be delivered to an appropriate disposal center or to the original equipment dealer.
- When lifting the unit, absolutely do not use hooks inserted in the side handles, use special equipment (e.g. lifting devices, trolleys, etc.).
- Carefully recover refrigerant within this unit before final disposal or when servicing. Never vent refrigerant to atmosphere. Use approved recovery equipment for R-410A refrigerant. Do not use R-22 equipments.

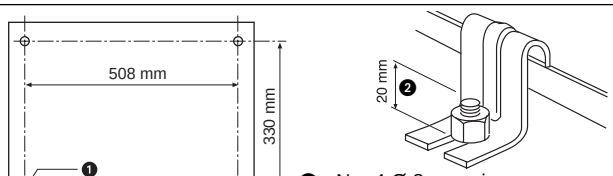
Choosing the installation site

Positions to avoid:

- Exposed to direct sun.
- Too close to sources of heat radiation, vapour or flammable gas.
- Particularly dusty areas.

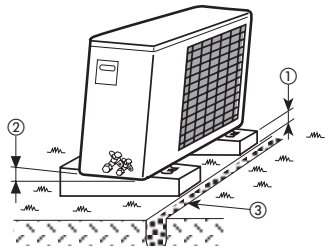
Recommendations:

- Choose a position protected from opposing winds.
- Choose a position sheltered from direct sun.
- Choose an area where air outlet and unit noise will not bother your neighbours.
- Choose a position that allows for the clearances required.
- Floor structure should be adequately strong to support unit weight and minimize vibration transmission.
- Consider a position which will not obstruct passageways or doors.



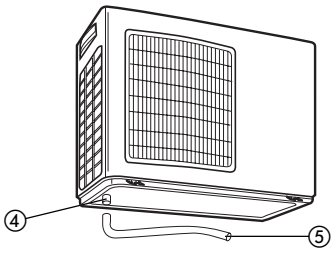
❶ No. 4 Ø 8 mm pins.
❷ Protrusion height from the support surface max. 20 mm.

- Fix the unit with locally purchased bolts buried in the block to prevent overturning due to strong gusts of wind.



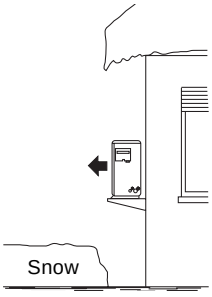
① 100 mm min.
② 20 mm gradient.
③ Gravel-filled trench.

- For heat pump models, unit must be adequately raised above floor surface.



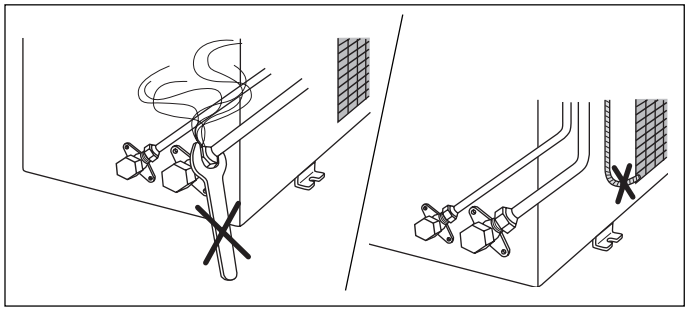
④ Drain fitting
⑤ Vinyl pipe

- To drain the condensate water to a drain while operating in heating mode, insert the drain fitting into the hole underneath on the left of the basin and use a vinyl pipe with a 16 mm internal diameter. It must not be used at temperatures lower than 0°C. (not supplied for low temperature versions).

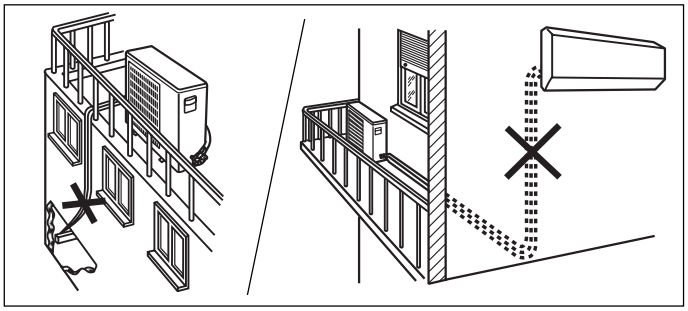


- If the unit is installed in areas where heavy snowfalls may occur, it is necessary to raise its level at least 200 mm above the usual snow level or alternatively to use the outdoor unit bracket kit.

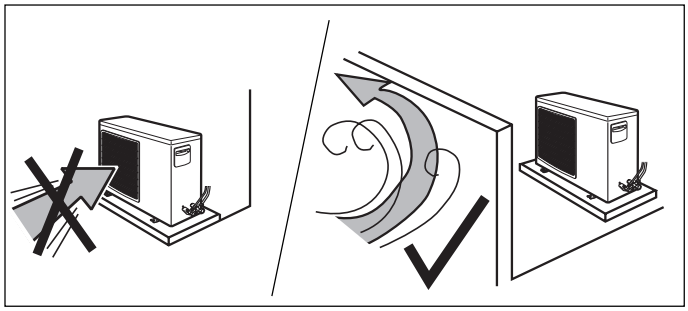
Warnings: avoid....



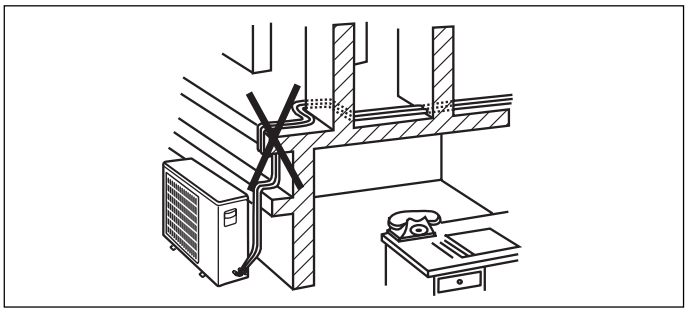
Disconnecting the refrigerant connections after installation: thiis will cause refrigerant leaks.
Connecting the condensate drain pipe to the outdoor unit.



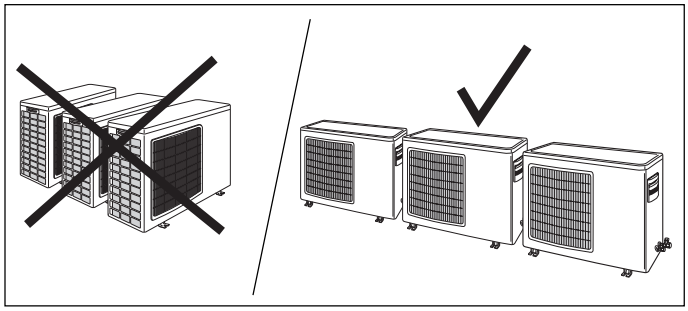
Excessive height difference between indoor and outdoor unit (see Table II "Connections"). Excessive distance between indoor and outdoor units. (see Table II "Connections").



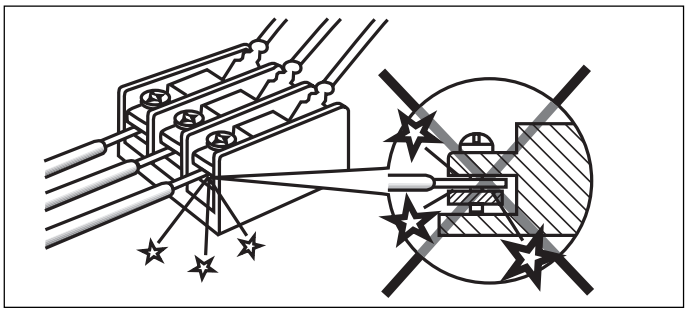
Predominant head winds.



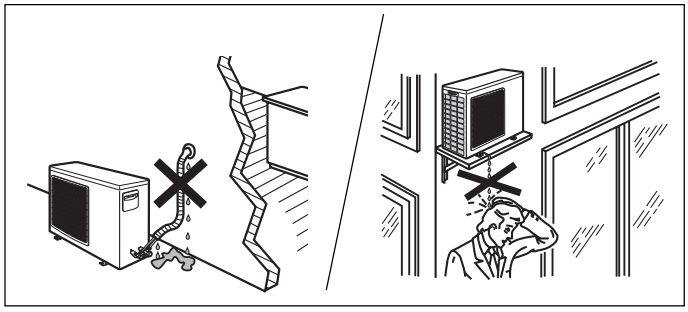
Unnecessary turns and bends in the connecting pipes.



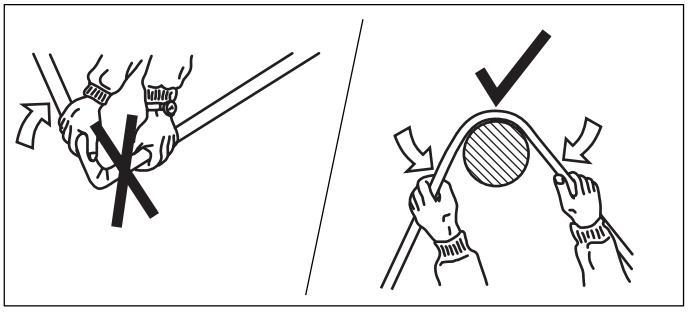
Multiple unit installation with units facing each other.



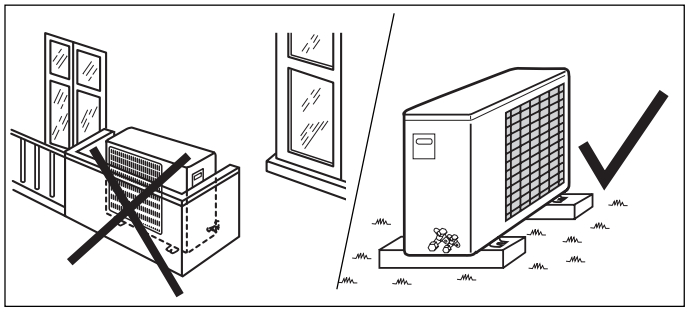
Any slack in the electrical connections.



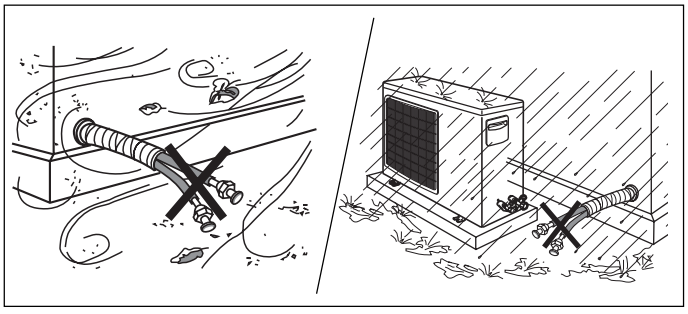
Insulating the connecting pipes only partially, which will cause dripping.
Dripping into passageways.



Flattening or kinking of refrigerant or condensate pipes.



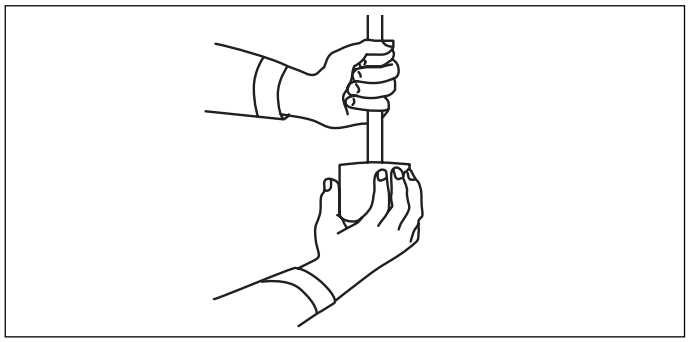
Any obstruction of the unit air outlet and intake or any obstacle that is too close (see minimum clearances required). Installation on grassy ground or soft surfaces (in these cases a solid foundation must be included).



Soiling of pipe ends.
Allowing piping to get wet before connection.

Refrigerant connections

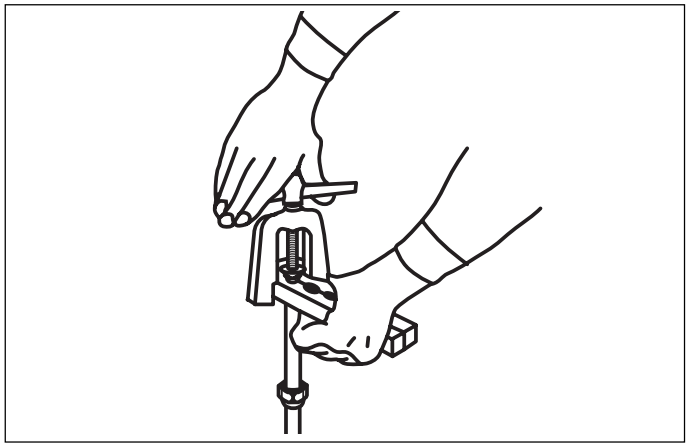
Flaring the ends of the tubing



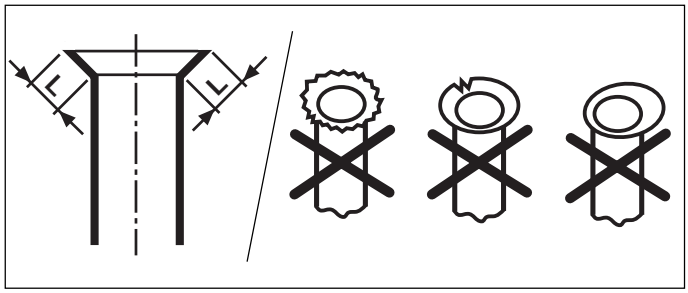
Remove protective caps from copper tube ends.
Position tube end downward, cut the tube to the requested length and remove the burrs with a reamer.

Do not leave system open to atmosphere any longer than minimum required for installation.
Oil in the compressor is extremely susceptible to moisture absorption.
Always keep ends of tubing sealed during installation.

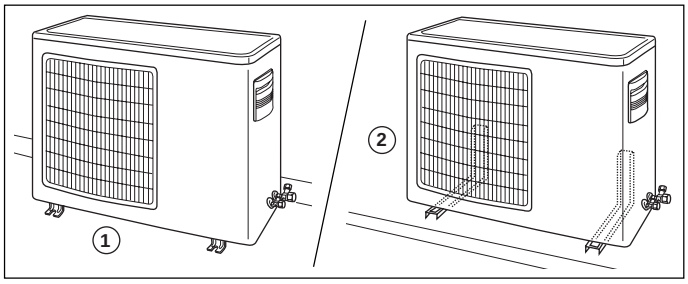
The maximum residual quantity of oil used for tubing is 40 mg/10 m.



Remove flare nuts from the unit connections and place them on the tube end.
Flare the tube with the flaring tool.

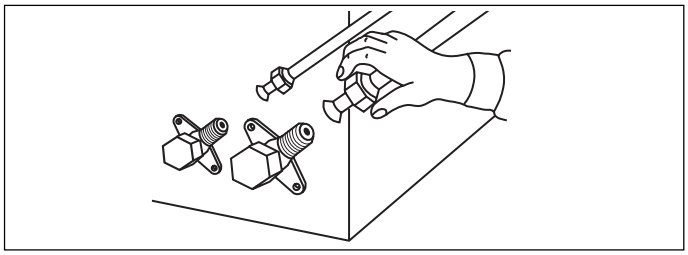


Flare end must not have any burrs or imperfections.
The length of the flared walls must be uniform.



The unit can be installed:
① on the floor;
② on the wall using the bracket kit.

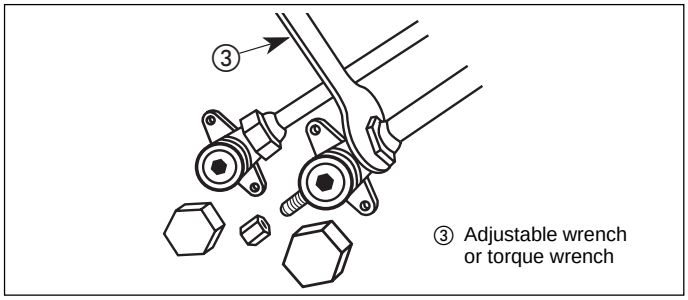
Connect tubing in accordance with the limits shown on Table II (Connections).
Finger-tighten the fitting several turns, then tighten it with a wrench by applying the tightening torque indicated in the table.



Where required, the unit must be charged with additional refrigerant.
Additional charge must be added using electronic scales and the service port (5/16") on the suction line.

Charge refrigerant only in liquid phase (bottle turned upside down or using the specific connection on bottle; see page 1).

Connection to unit

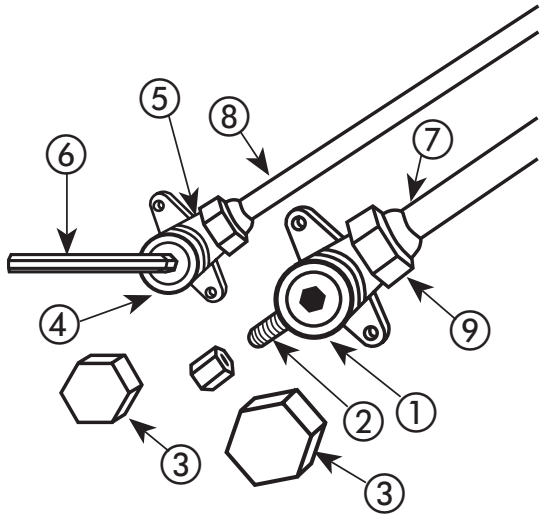


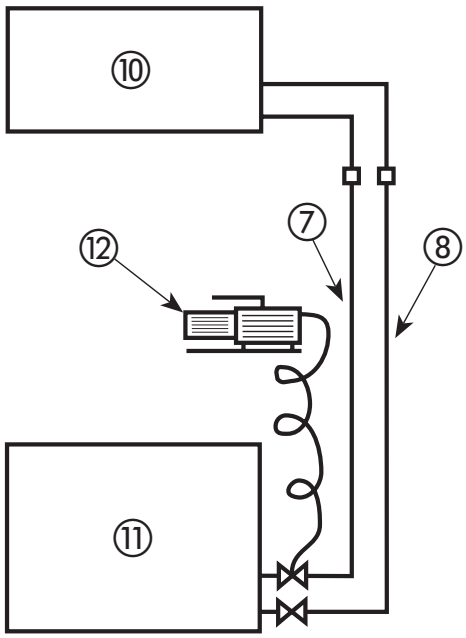
Insufficient tightening torque will cause gas leaks.
Overtightening the fittings will damage the tube flaring and cause gas leaks.

Pipe diameter	Tightening torque Nm
6.35 mm (1/4”)	18
9.52 mm (3/8”)	42
12.70 mm (1/2”)	55
15.87 mm (5/8”)	65
19.05 mm (3/4”)	100

Tightening torque										
Valve	Flare nut		Valve cap		Pressure port cap		Valve needle		Pressure port	
	Wrench mm	Nm	Wrench mm	Nm	Wrench mm	Nm	Wrench mm	Nm	Wrench mm	Nm
1/4”	17	18	23	20	18	16 - 18	Allen (hex.) 5	9	–	0.34
3/8”	22	42	23	20	18	16 - 18	Allen (hex.) 5	9	–	0.34
1/2”	26	55	29	40	18	16 - 18	Allen (hex.) 5	13	–	0.34
5/8”	29	65	29	40	18	16 - 18	Allen (hex.) 5	13	–	0.34
3/4”	36	100	38	40	18	16 - 18	Allen (hex.) 5	13	–	0.34

Refrigerant connections





① Three-way valve
② Needle valve
③ Valve cap
④ Valve needle
⑤ Two-way valve
⑥ Allen (hex. head) wrench
⑦ Gas line (large diameter)
⑧ Gas line (large diameter)
⑨ Flare nut
⑩ Indoor unit
⑪ Outdoor unit
⑫ Vacuum pump

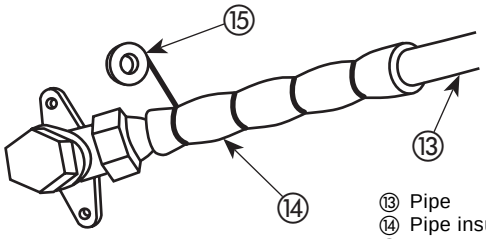
Air purging

Use only a vacuum pump to purge air from the piping.

NEVER use the system compressor as a vacuum pump.

NEVER use the unit refrigerant gas to purge the connecting pipes.

No additional refrigerant has been provided in the unit for this purpose.
Remove the caps from the two and three-way valves.
Create a vacuum with a vacuum pump connected to the service connection of the suction shut-off valve, as shown, keeping the shut-off valves completely shut until a 50 Pa (0.5 mbar) vacuum has been reached.
Now open the two-way valve for 3 sec., then quickly shut it to check for possible leaks.
After the leak check, fully open the two and three-way valves.
Replace caps and check for leaks.



⑬ Pipe
⑭ Pipe insulation
⑮ Fastening tape

Once all connections have been completed, check for leaks by using a leak detector specific for HFC refrigerants.
Finally wrap the valves and pipes with anti-condensate insulation and tighten this with tape, without exerting too much pressure on the insulation.
Repair and cover any possible cracks in the insulation.
Fix the pipes to the wall with hooks or conduits.

Table III: Operating limits (1)

Cooling (2)	Maximum conditions	Outdoor temperature 43°C
		Indoor temperature 32°C d.b.; 23°C w.b.
	Minimum conditions	Outdoor temperature 15°C (4)
		Indoor temperature 21°C d.b.; 15°C w.b.
Heating (3)	Maximum conditions	Outdoor temperature 24°C d.b.; 18°C w.b.
		Indoor temperature 27°C d.b.
	Minimum conditions	Outdoor temperature –15°C d.b.; –17°C w.b.
Mains power supply	Nominal three-phase voltage Operating voltage limits	400V 3N~ 50Hz **min. 342V – max. 462V**

Notes:
1. Data referred to the outdoor unit only.
2. According to ISO 5151.2/T1.
3. According to ISO 5151.2/High+.
4. The units 38YYS are equipped with a high pressure cut-out, which is suitable for outdoor temperatures up to -15C°.

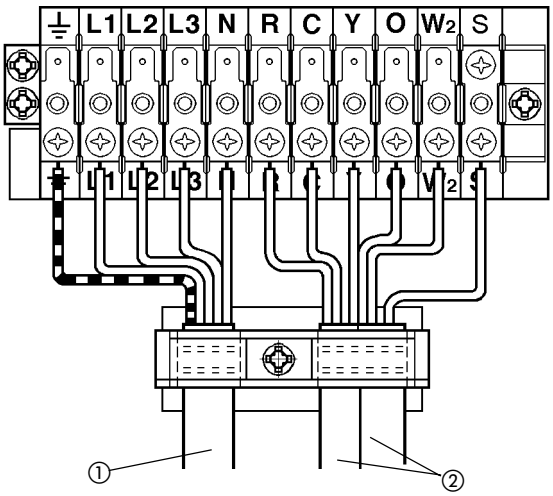
d.b. - dry bulb; **w.b.** - wet bulb.

WARNING:

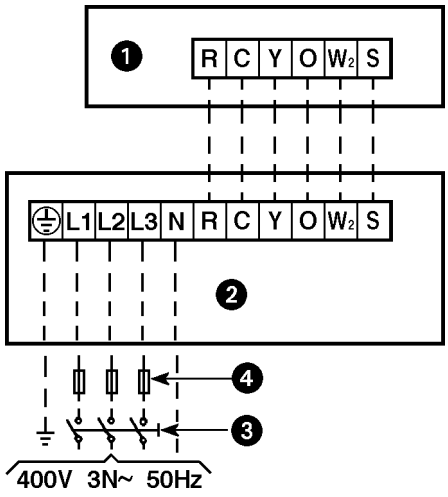
During heat pump operation unit will undergo several defrost cycles to eliminate ice that might possibly collect on the outdoor unit in very low ambient temperatures.
In these cycles, fan speed will automatically reduce and cannot be varied until defrost cycle is completed.

Electrical connections

Heat pump unit

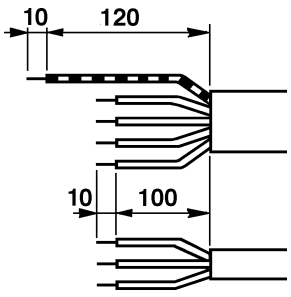


Heat pump system



Terminal box legend, all models

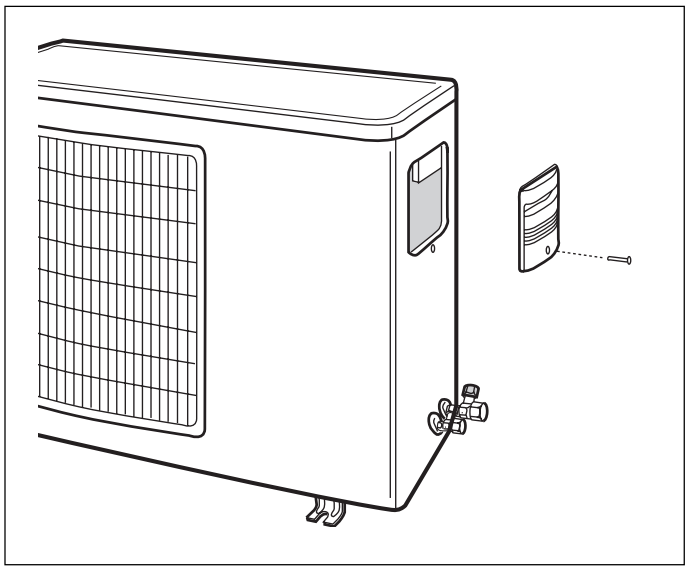
- ⏚ Earth
- **L1** Live power supply
- **L2** Live power supply
- **L3** Live power supply
- **N** Neutral power supply
- **R** Live connection indoor/outdoor unit
- **C** Neutral connection indoor/outdoor unit
- **Y** Compressor interlocking contact
- **O** Reversing valve control (Heat pump only)
- **W2** Outdoor fan signal (Heat pump only)
- **S** Defrost end signal



① Power supply cable (H07 RN-F)
② Interconnection cable (A07 RN-F)

❶ Indoor unit
❷ Outdoor unit
❸ Main switch
❹ Time-delay fuse or circuit breaker (see table IV "Electrical data").

Electrical connections



Remove electric box cover.
Connect the wires to the terminals according to the wiring diagram and firmly tighten.

IMPORTANT:
- **Make ground connection prior to any other electrical connections.**

- Make refrigerant connections before electrical connections. When deconnecting, deconnect electrical connections before refrigerant connections.
- Make electrical connections between units prior to proceeding to main supply unit connection.
- Before proceeding with the unit connection to the mains supply locate live **L1, L2, L3** and neutral **N**, then make connections as shown in the wiring diagram.
- Ensure that main supply connection is made through a switch that disconnects all poles, with contact gap of a least 3 mm.
- The main supply connecting cable must be H07 RN-F (or higher) type, synthetic rubber insulation with Neoprene coating, according to EN 60335-2-40 codes.
- When the electric supply cables **L1 (R)**, **L2 (S)**, **L3 (T)** are connected inversely, a special **"PSC"** phase inversion protection device blocks the compressor to prevent the same from rotating inversely.
  In this case, switch off the electrical supply and check the correctness of the sequence of the cables of the supply line connected to the main terminal block (they are probably inverted).
  The compressor will only be allowed to work if the phase sequence is correct.
  The phase sequence protection device also continuously monitors the electrical supply line and if one of the phases is completely missing it blocks the compressor.
  The device only re-starts the compressor after the supply line is correctly restored.
  All the three phase compressors have identical internal wiring. For this reason when the correct phase connections for a specific system have been determined, the rotation direction will always be correct if the same connections are made to the terminal block (for the other equipment).

Note:
All field electrical connections are the responsibility of the installer.

Refer to the indoor unit installation manual for sizing the connection wires between units.

Note:
After connections have been completed, replace electric box cover.

Table IV: Electrical data

	Starting current (2)	Power input (5)								Main power connections (6)		Inter-connections
		Cooling				Heating						
		Nominal conditions 400V 3N~ 50Hz ISO 5151.2/T1 indoor 27°C d.b. 19°C w.b. outdoor 35°C d.b. 24°C w.b.		Peak conditions 342V 3N~ 50Hz ISO 5151.2/T1 indoor 32°C d.b. 23°C w.b. outdoor 43°C d.b. 32°C w.b.		Nominal conditions 400V 3N~ 50Hz ISO 5151.2/High+ indoor 20°C d.b. 15°C w.b. outdoor 7°C d.b. 6°C w.b.		Peak conditions 342V 3N~ 50Hz ISO 5151.2/High+ indoor 27°C outdoor 24°C d.b. 18°C w.b.		Time-delay fuse gL type	Wire size (3-4)	Wire size (3-4)
Heat pump	**A**	**A**	**W**	**A**	**W**	**A**	**W**	**A**	**W**	**A**	**mm²**	**mm²**
38YY(S)-028G9	37	5.5	2990	7.3	3700	5.0	2550	7.0	3670	16	2.5	1
38YY(S)-036G9	39	6.3	3295	8.3	4250	5.7	2850	7.8	3890	16	2.5	1
38YY(S)-048G9	54	7.0	3415	8.4	4060	6.9	3360	8.9	4380	16	2.5	1
38YY(S)-060G9	60	10.1	5034	12.1	5905	9.3	4451	11.5	5630	25	2.5	1

Notes:
1. **Unit is suitable for outdoor installation.**
2. Starting current duration is usually lower than 1 sec.
3. Wire size shown applies to line length up to 15 m.
4. If the indoor unit is provided with an electric heater, consult indoor unit installation manual for correct sizing of the wires.
5. Data referred to the outdoor unit only.
6. The main supply connecting cable must be H07 RN-F (or higher) type , synthetic rubber insulation with Neoprene coating, according to EN 60335-2-40.

38YY...G9 / 38YYS...G9 R-410A

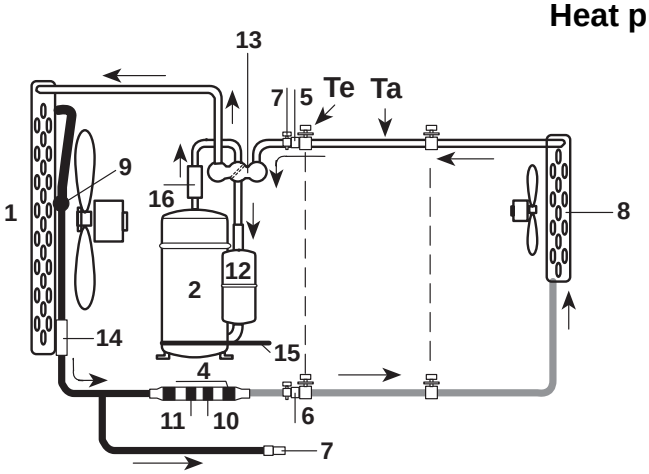
Pump Down, refrigerant circuit and unit maintenance

Pump Down

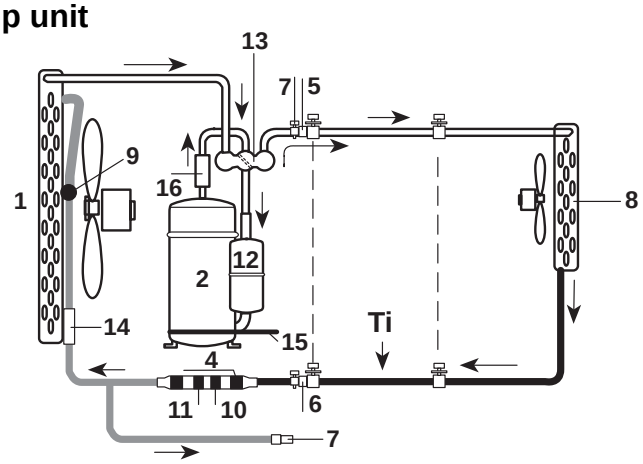
Pump down is an operation intended to collect all the system refrigerant in the outdoor unit.
This operation must be carried out before disconnecting the refrigerant tubing in order to avoid refrigerant loss to the atmosphere, if it becomes necessary to disconnect the refrigerant connections for unit repair, removal or disposal; in this case, after removal, unit must be delivered to an appropriate disposal centre or the original dealer.

Shut off the liquid valve with the Allen wrench.
Turn the system on in cooling with fan operating at high velocity. (Compressor will immediately start, provided 3 minutes have elapsed since the last stop).
After 2 minutes of operation, shut the suction valve with the same wrench. Turn the system off and switch mains supply off.
Disconnect tubing. After disconnection, protect valves and tubing ends from dust.
Connect a gage on low side during a condenser pump down. Compressor damage may occur if run at a negative suction pressure.

Refrigerant circuit
Heat pump unit



Cooling cycle



Heating cycle

Legend:

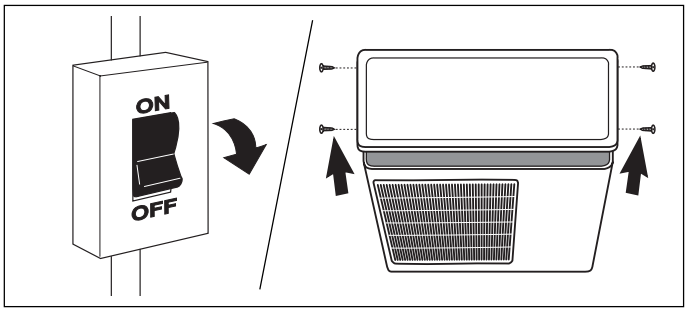
① Outdoor coil
② Compressor “scroll”
③ Metering device
④ Strainer
⑤ Vapor valve
⑥ Liquid valve
⑦ Service pressure port
⑧ Indoor unit coil
⑨ Liquid distributor
⑩ Cooling metering device
⑪ Heating metering device
⑫ Additional suction accumulator
⑬ Reversing valve
⑭ Outdoor coil sensor
⑮ Crankcase heater
⑯ Discharge muffler

Gas
Liquid + Gas
Liquid

Unit maintenance

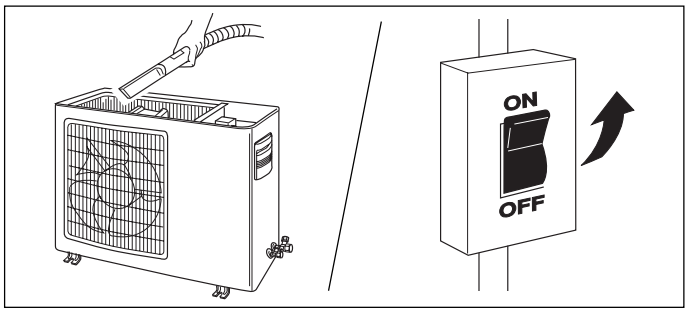
The following maintenance operations must be carried out by qualified personnel.

Cleaning the coil
When necessary, proceed as follows for more careful cleaning of the coil:



Switch the mains supply OFF.

Remove unit top cover by losening holding screws and lifting the cover.



Carefully clean the coil with a vacuum cleaner from inside to outside.
With the same vacuum cleaner, dust the inside of the fan compartment and the fan blades.
Avoid any damage to the blades which may cause future vibrations and noise.

Replace the unit cover and tighten the screws.

After long shutdown periods and at commissioning (for heat pump models only).

Energize the system by putting the main switch to ON without starting the unit. (The remote control must be in the OFF position at least 12 hours before the initial start up).
Do not disconnect the main switch during the unit operating season.

Troubleshooting

Compressor and fan of the outdoor unit will not start:

- Unit not energized; check the main power connections.
- Main switch OFF; check and put to the ON position.
- Main switch fuses have blown; replace.
- Wait for 3 minutes; compressor cycling protection is on.
- Pressure switch open; check and eliminate cause.
- Main voltage too low.
- Electrical connections loose or wrong; check and repair.

Compressor will not start, but outdoor fan is running:

- Electrical connections of compressor loose or wrong; check and repair.
- Compressor burnt out, seized or protection device on; check for the cause and replace compressor if necessary.
- Run capacitor faulty (single-phase models); replace.

Compressor starts, but stops due to its overtemperature protection (other than stops caused by the normal operation of the thermostat):

- Wrong refrigerant charge (excessive or low) or air or other non condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Main voltage wrong (too high or too low).
- Condenser coil (outdoor or indoor, in case of heat pump operation) obstructed; remove obstructions.
- Outdoor fan off; check cause and repair.
- Run capacitor faulty; check and replace.
- Wrong indoor unit thermostat; replace.
- Refrigerant circuit clogged; check and remove obstructions.
- Reversing valve faulty on heat pump models; replace.
- Expansion device clogged or covered with ice; drain refrigerant (see note 1), evacuate and recharge.

Compressor runs continuously:

- Unit selected too small for actual air conditioning needs.
- Indoor temperature selection too low (if in cooling) or too high (if in heating, for heat pump models); check temperature selection.
- Refrigerant charge low; check and add refrigerant.
- Outdoor unit fan faulty; replace.
- Air or other non condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Obstructions at air intake or dirty indoor unit filters; remove obstruction or clean filter.

Frequent ice build-up on outdoor coil (during heating with heat pump units):

- Outdoor fan stopped; check cause and repair.
- Wrong electrical connections on defrost circuit; check electrical connections and repair.

Discharge pressure too high:

- Outdoor coil dirty or obstructed; clean or remove obstructions.
- Condenser fan (outdoor or indoor, in case of heat pump operation) faulty; replace.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Air or other non-condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.

Discharge pressure too low:

- Refrigerant charge too low; add refrigerant.
- Outdoor coil dirty or obstructed; clean or remove obstructions.
- Indoor unit air filter dirty; clean filter.

Suction pressure too high:

- Internal high pressure relief valve open; check for cause and repair.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Reversing valve (on heat pump models) faulty or internal leak; replace.

Suction pressure too low:

- Refrigerant charge too low; add refrigerant.
- Evaporator coil (indoor or outdoor, in case of heat pump models),covered with ice; see the following points.
- Air circulation on the evaporator unit (indoor or outdoor, in case of heat pump models) not sufficient; check for the cause and repair.
- Expansion device or suction line clogged: check and repair.
- Outdoor fan does not stop during defrost periods (when heating with heat pump models); check electrical connections.
- Defrost thermostat faulty (heating with heat pump models); replace.
- Contact between tube and defrost thermostat (heating with heat pump models) faulty; check and repair.

Outdoor fan cycling due to its overtemperature protection:

- Fan capacitor faulty; replace.
- Electrical connection loose; check connections.
- Fan bearing seized; check and repair.
- Expansion device clogged or covered with ice; drain refrigerant (see note 1), evacuate and recharge.
- Defrost relay open (heating with heat pump models); replace.

Outdoor fan motor running always at low speed:

- A wiring not connected to the board; check connections between temperature sensor and board.
- Temperature sensor is fault; replace the sensor.
- Electronic board broken; replace board.

Outdoor fan motor running always at high speed:

- Temperature sensor is short circuited; replace temperature sensor.
- Electronic board broken; replace board.

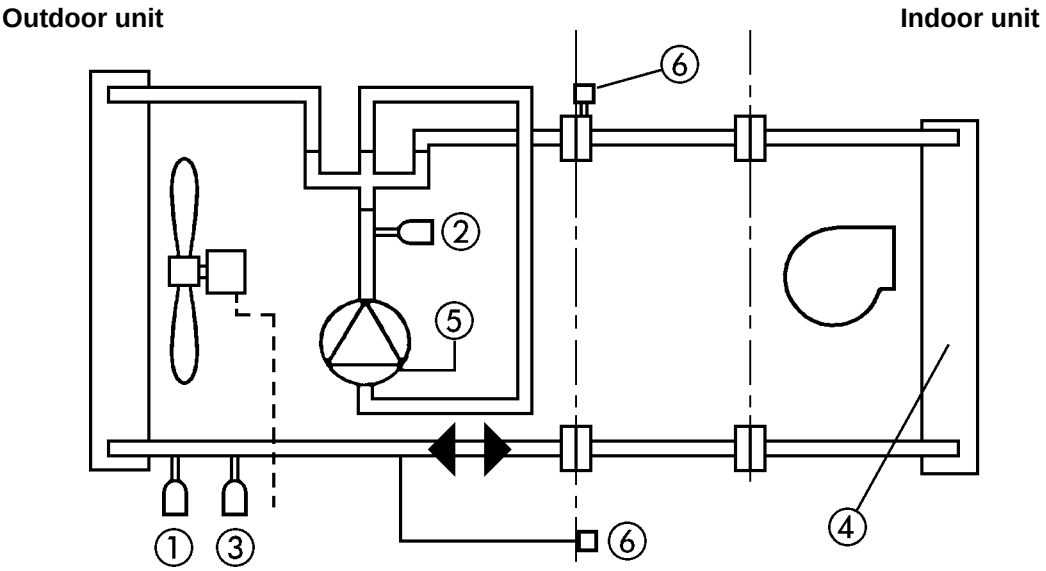
Note 1:
Do not release refrigerant to the atmosphere; use refrigerant recovery equipment.

Guide for the owner

When installation and tests are completed explain the Operation and Maintenance Manual to the owner, with particular attention to the main operating modes of the air conditioner, such as:

- Turning the unit on and off.
- Functions of the remote control.
- Removal and cleaning of the air filters.

Leave the two installation manuals for the indoor and outdoor units with the owner for future use during maintenance operations or for any other needs.



① Temperature sensor
② High pressure cut-out
③ Loss of refrigerant pressure switch
④ Anti freeze thermostat
⑤ Crankcase heater
⑥ Pressure service port

38YYS…G9 units are designed to work in North European countries climates.

They are factory equipped with Head Pressure Controller, temperature sensed (HPC), high pressure switch (HIP), loss of refrigerant pressure switch (LRPS) and crankcase heater.

Operating range

Minimum ambient temperature: –15°C

Power supply

Nominal three-phase voltage: 400V 3N~ 50Hz
Operating voltage limits **min. 342V**
max. 462V

Features

– **HPC** and **HIP** Remote Manual Reset
Low ambient head pressure controller (HPC) temperature sensor type for monosplit.
Printed circuit board (PCB), nude with insulation coating, quick connection terminals, Heat Pump select terminal.
The Head Pressure Controller allows the operating in cooling mode up to –15°C ambient temperature keeping the condensing temperature always above 41°C - 42°C.
The “HPC” automatically feels the possible Heating Mode Working, allowing in this case the outdoor unit fan motor to operate at full speed.

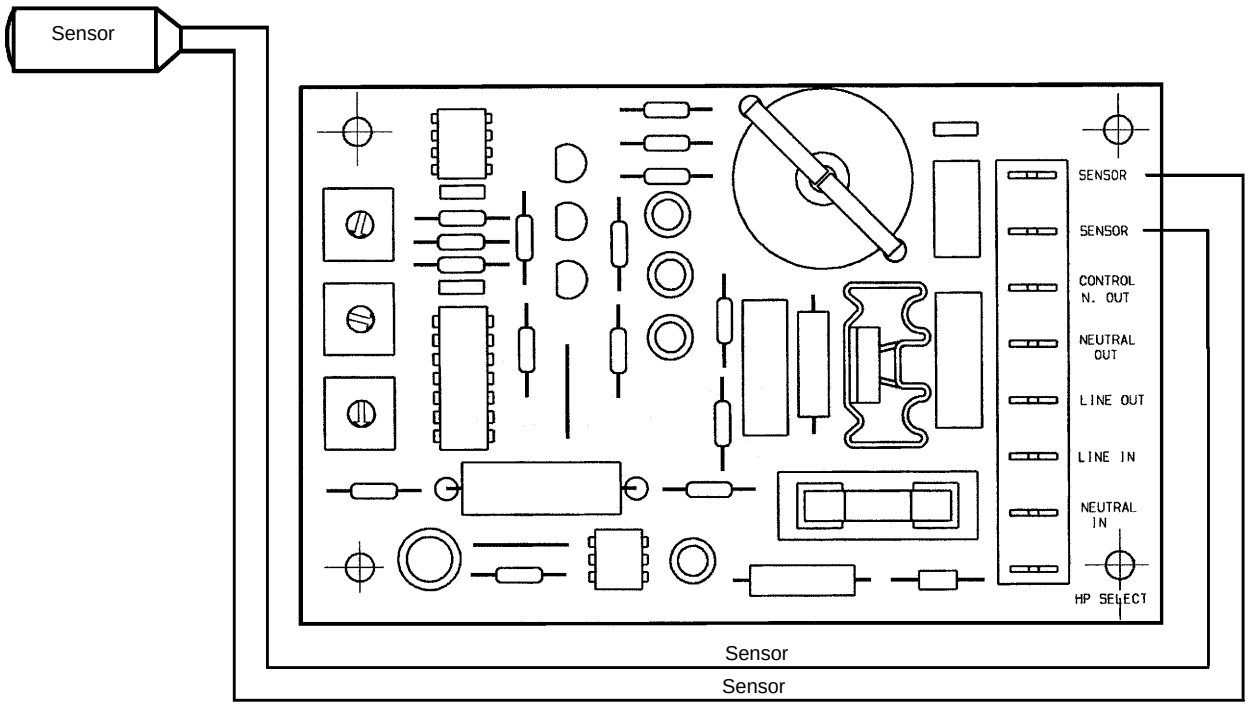
– **HIP** High pressure switch, brazed between outdoor coil and expansion device, remote manual reset through on-off switch of indoor room thermostat.

Set point
– open at 4200 kPa (42 bar; 610 psig) pressure
– close at 3000 kPa (30.0 bar; 420 psig) pressure

– **LRPS** Loss of refrigerant pressure switch: brazed between outdoor coil and expansion device when with unit not working, the pressure “high side” drops below 345kPa (3.45 bar; 50 psig) for refrigerant losses, the compressor cannot restart.

Set point
– open at 345 kPa (3.45 bar; 50 psig) pressure
– close at 650 kPa (6.5 bar; 95 psig) pressure

Head pressure controller: wiring from temperature sensor to printed circuit board



Head pressure controller and HIP remote manual reset

Configuration
The Head Pressure Control “HPC” is made of two parts:

- Printed circuit board, with electronic components and quick connector terminals.
- Temperature sensor, complete with 500 mm wiring.

For the user convenience “HIP” has been selected at automatic reset.
If “HIP” trips, cycle the power supply OFF and ON to reset the system, because the electrical box is equipped with relais that prevent the unit from starting, till the indoor control is switched OFF.
When head pressure drops below 3000 kPa (30 bar; 420 psig) it is possible to restart the unit switching the indoor control ON.

Operations mode

Full voltage:
When the liquid line temperature is over the setpoint value plus half proportional band (factory set by supplier), the output voltage to the motor is 97% or more of supply voltage.

Low voltage:
When the liquid line temperature is below set point minus half proportional band, the output voltage to the motor is fixed to 125V.

Hard start:
At each compressor starting the full voltage output to the fan motor is provided for 3 seconds.

Proportional band:
The controller directly senses the changes in liquid line temperature and varies the output voltage which causes the fan motor speed increase or decrease.

Temperature setting

Proportional band	set point +11 / –11°C
Minimum speed output voltage:	125 V
Setting:	the head pressure controller is supplied factory set at 42°C
Hard start time	3 seconds.

Troubleshooting

See paragraph “Troubleshooting”.

Note:
In case of first start after a pause of several hours at – 15°C, with low voltage supply (198V) high pressure switch HIP may trip off the unit.
In this case, the remote reset by indoor control (infrared) can be done for unit restarting.

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The manufacturer reserves the right to change any product specifications without notice.

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